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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,994	01/16/2004	Changkyu Choi	1793.1172	5012
21171	7590	01/10/2008		
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			EXAMINER PAUL, DISLER	
			ART UNIT 2615	PAPER NUMBER
			MAIL DATE 01/10/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/757,994	<b>Applicant(s)</b> CHOI ET AL.	
	<b>Examiner</b> Disler Paul	<b>Art Unit</b> 2615	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-24 is/are allowed.
- 6) ☒ Claim(s) 25-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/10/04;2/2/05</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 25-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoshuyama ("6,449,586 B1").

Re claim 25, Hoshuyama disclose of the method of removing noise from time delayed signals subject to noise, comprising: receiving signals having noise components; delaying the received signals having the noise components by a predetermined period of time to generate delayed received signals; adding the delayed received signals to generate a combination received signal (fig.1 (3); col.3 line 5-13/beamformers delayed as groups); generating separate clean signals without noise components using adaptive feedback filtering based on the delayed received signals, the combination received signal, and the separate clean signals (fig.1 (5)/ with delay and total and feedback for clean signals); and generating a clean signal without noise components using the separate clean signals (fig.1 (5,7) clean signals is generated).

Re claim 26, the method of claim 25, wherein using adaptive feedback filtering comprises: generating separate clean signals without noise components by subtracting noise components, output from adaptive canceling filters having predetermined coefficients, from the combination received signal (col.4 line 45-67); generating separate noise signals by subtracting signals output from adaptive blocking filters having predetermined coefficients, which receive the separate clean signals, from the delayed received signals (fig.1 (4,5); col.3 line 30-50).

Re claim 27, the method of claim 26, wherein generating the clean signal without noise components comprises adding the separate clean signals (fig.1(5) with feedback clean signals updated).

Re claim 29, the method of claim 26, further comprising: updating the coefficients of the adaptive canceling filters and the adaptive blocking filters automatically by an information maximization algorithm (col.3 line 30-67; col. 5 line 10-37).

Re claim 30, the method of claim 26, further comprising: updating the coefficients of the adaptive canceling filters and the adaptive blocking filters automatically by one of a least square algorithm and a normalized least square algorithm (col.3 line 34-45).

Re claim 28 has been analyzed and rejected with respect to claim 29 above.

***Allowable Subject Matter***

3. Claims 1-24 are allowed.

Re claims the independent claims 1,8,24, while, Hoshuyama disclose of Re claim 1, Hoshuyama disclose of an adaptive beamforming method comprising: compensating for time delays of M noise-containing speech signals input via a microphone array having M microphones, wherein M is an integer greater than or equal to 2, and generating a sum signal of the M compensated noise-containing speech signals; and extracting pure noise components from the M compensated noise-containing speech signals using M adaptive blocking filters that are connected to M adaptive canceling filters with blocking feedback filters to extract noise; and extracting pure speech components from the sum signal using the M adaptive canceling filters that are connected to the M adaptive blocking filters.

However, Hoshuyama fail to disclose of extracting pure noise component form the M compensatd noise-containing speech using feedback providing a noise-removed signal to the M adaptive filter with the

adaptive block filter and canceling filters being connected in a feedback structure for generating the noise-removed signal from the sum signal by providing pure noise components to the M adaptive canceling filters.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/757,994

Art Unit: 2615

Page 6

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 25-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoshuyama ("6,449,586 B1").

Re claim 25, Hoshuyama disclose of the method of removing noise from time delayed signals subject to noise, comprising: receiving signals having noise components; delaying the received signals having the noise components by a predetermined period of time to generate delayed received signals; adding the delayed received signals to generate a combination received signal (fig.1 (3); col.3 line 5-13/beamformers delayed as groups); generating separate clean signals without noise components using adaptive feedback filtering based on the delayed received signals, the combination received signal, and the separate clean signals (fig.1 (5)/ with delay and total and feedback for clean signals); and generating a clean signal without noise components using the separate clean signals (fig.1 (5,7) clean signals is generated).



Re claim 26, the method of claim 25, wherein using adaptive feedback filtering comprises: generating separate clean signals without noise components by subtracting noise components, output from adaptive canceling filters having predetermined coefficients, from the combination received signal (col.4 line 45-67); generating separate noise signals by subtracting signals output from adaptive blocking filters having predetermined coefficients, which receive the separate clean signals, from the delayed received signals (fig.1 (4,5); col.3 line 30-50).

Re claim 27, the method of claim 26, wherein generating the clean signal without noise components comprises adding the separate clean signals (fig.1(5) with feedback clean signals updated).

Re claim 29, the method of claim 26, further comprising: updating the coefficients of the adaptive canceling filters and the adaptive blocking filters automatically by an information maximization algorithm (col.3 line 30-67; col. 5 line 10-37).

Re claim 30, the method of claim 26, further comprising: updating the coefficients of the adaptive canceling filters and the adaptive blocking filters automatically by one of a least square algorithm and a normalized least square algorithm (col.3 line 34-45).

Re claim 28 has been analyzed and rejected with respect to claim 29 above.

***Allowable Subject Matter***

3. Claims 1-24 are allowed.

Re claims the independent claims 1, while, Hoshuyam disclose of of an adaptive beamforming method comprising: compensating for time delays of M noise-containing speech signals input via a microphone array having M microphones, wherein M is an integer greater than or equal to 2, and generating a sum signal of the M compensated noise-containing speech signals; and extracting pure noise components from the M compensated noise-containing speech signals using M adaptive blocking filters that are connected to M adaptive canceling filters with blocking feedback filters to extract noise; and extracting pure speech components from the sum signal using the M adaptive canceling filters that are connected to the M adaptive blocking filters.

However, Hoshyama fail to disclose of extracting pure noise component form the M compensatd noise-containing speech using feedback providing a noise-removed signal to the M adaptive filter with the adaptive block filter and canceling filters being connected in a

feedback structure for generating the noise-removed signal from the sum signal by providing pure noise components to the M adaptive canceling filters.

Similarly, Re claims 8,16 has been analyzed and allowed partly for incorporated the similar limitation as claim 1 above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Disler Paul whose telephone number is 571-270-1187. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Application/Control Number: 10/757,994

Page 6

Art Unit: 2615

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1/7/08